REMARKS

INTRODUCTION:

In accordance with the foregoing, claims 1, 5, 8, 11, 13, 15, 18, and 21 have been amended. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1, 5, 8, 11, 13, 15, 18, and 21 are pending and under consideration. Reconsideration is requested.

A. REJECTION UNDER 35 U.S.C. §112:

In the Office Action at page 2, the Examiner again rejects claims 5, 8, 11, 13, and 15 under 35 U.S.C. §112, second paragraph, as being indefinite in reciting the term "family." The rejection is respectfully traversed and reconsideration is requested.

On page 2 of the Advisory Action, the Examiner notes that a replacement of the term "family" by using the term comprising to describe the group would obviate the issue. The Examiner is thanked for the suggestion and claims term "family" has been removed and replaced with the term "comprising" or "comprises" in accordance with the suggestion. As such, it is respectfully requested that the Examiner reconsider the rejection under 35 U.S.C. §112.

B. OBJECTION UNDER 37 CFR 1.75(C)

On pages 2-3 of the Office Action, the Examiner objects to claims 8, 11, and 15 as failing to limit the scope of the claims from which they depend. In view of the above amendments, it is respectfully submitted that the claims have varying scope. As such, it is respectfully requested that the Examiner reconsider the objection to the claims.

C. REJECTION UNDER 35 U.S.C. §102:

1. Rejection of claims 1, 2, 7, 9, 11, 13-15, and 17-21 in view of Coombs et al.

In the Office Action at pages 3-4, the Examiner rejects claims 1, 2, 7, 9, 11, 13-15, and 17-21 under 35 U.S.C. §102(b) in view of Coombs et al. (U.S. Patent No. 5,604,003). This rejection is respectfully traversed and reconsideration is requested.

By way of review, Coombs et al. discloses an optical information carrier having layers of material in an MIPIM structure. In Example 2, the MIPIM structure includes a reflective layer 5 of Au, a dielectric layer 7 of Ta_2O_5, a recording layer 9 of $Ge_{50}Te_{25}Se_{25}$, a dielectric layer 11 of Ta_2O_5, and a reflective layer 13 of Au. (Col. 3, lines 8-26, col. 5, lines 7-20, col. 8, lines 9-28; FIG. 4). One of the reflection layers 5 and 13 is disclosed as being fully reflective, while the other is disclosed as being semi-transparent. (Col. 3, lines 23-26). Thus, when irradiated by a laser-light beam a, some of the light beam a passes through the semi-transparent reflective layer 5 in order to form a light spot on the recording layer 9 as shown in FIG. 4.

In contrast, claim 1 is recites that "the phase control layer comprises a material selected from the group consisting essentially of GeSbTe, InSbTe, and Ni." As such, it is respectfully submitted that Coombs et al. does not disclose the invention of claim 1.

Similarly, it is respectfully submitted that Coombs et al. does not disclose the invention recited in claims 18 and 21.

Claims 2, 9, 11, 13-15, 17, 19, and 20 are deemed patentable due at least to their depending from corresponding claims 1 and 18.

2. Rejection of claims 1, 2, 9-11 and 13-21 in view of Tominaga et al.

In the Office Action at pages 4-5, the Examiner rejects claims 1, 2, 9-11 and 13-21 under 35 U.S.C. §102(b) in view of Tominaga et al. (U.S. Patent No. 5,569,517). This rejection is respectfully traversed and reconsideration is requested.

The Examiner asserts that an AgSbTeInV phase-changing mask layer 32 discloses the

phase control layer as recited in claim 1. By way of review, Tominaga et al. discloses a mask layer 32 that is irradiated by a reading light. Within the reading light, the intensity decreases from a center to an edge. As such, the mask layer 32 is more intensely heated at a center of a light spot so as to undergo a crystal-to-crystal transition in area H, whereas the edge of the light spot does not undergo a transition in area L. In this way, light incident on only one of area H and area L is able to be reflected as to allow reading of information. (Col. 4, lines 65-67, col. 5, lines 1-27.

However, while Tominaga et al. discloses that the area H undergoes a crystal-to-crystal transition, Tominaga et al. does not disclose that the area H undergoes a crystal-to-amorphous transition when irradiated using a reading light.

On page 5 of the Office Action, the Examiner notes that Tominaga et al. does disclose that the mask layer 32 can become amorphous as discussed in col. 9, lines 1-5. However, while Tominaga et al. does disclose that the mask layer 32 can become amorphous due to recording light of high power, Tominaga et al. also discloses that, prior to being read out, the mask layer 32 is initialized to be in a crystal state. (Col. 9, lines 3-5). As such, Tominaga et al. does not disclose that a reading light changes the mask layer 32 from a crystal to an amorphous state.

On page 5 of the Office Action, the Examiner asserts that it is well known for phase change materials to act as a masking layer as disclosed on page 9, lines 1-20, of the instant application. However, it is noted that the Examiner's evidence of the assertedly well known behavior of the masking layer is based upon the description of an embodiment of the present invention, and is not based upon a description shown to be in the prior art. A review of page 9, lines 1-20 fails to reveal that the behavior of material as used in the phase control layer in the manner disclosed on page 9 is described as being known in the prior art. As such, it is respectfully submitted that it is unclear as to how the description of an embodiment of the instant invention qualifies as prior art under 35 U.S.C. §102.

In contrast, claim 1 recites a phase control layer having areas defined in a laser spot.

When irradiated by a reproducing beam, one of the areas changes between a crystal and an amorphous phase so as to alter an optical path of the reproducing beam reflected from the phase change recording layer. As such, it is respectfully submitted that Tominaga et al. does not disclose "a phase control layer... having two areas defined in a laser spot," "wherein the irradiation with the reproducing beam of said phase control layer within the laser spot causes a phase difference due to one of the two areas *changing between a crystal and an amorphous phase* that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 1.

Similarly, it is respectfully submitted that Tominaga et al. does not disclose "a phase control layer ... having a plurality of areas defined in a laser spot," "wherein the irradiation of the laser spot on said phase control layer with the reproducing beam causes a phase difference in the plurality of areas on said phase control layer due to *ones of the plurality of areas being converted between a crystalline and an amorphous state* that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 18; and that "the irradiation of the second laser spot on said phase control layer causes one area of said phase control layer within the second laser spot to be converted between a crystalline and an amorphous state so as to alter an optical path of a portion of the reproducing beam such that the second laser spot is larger than the first laser spot" as recited in claim 21.

Claims 2, 9-11, 13-17, 19 and 20 are deemed patentable due at least to their depending from corresponding claims 1 and 18.

3. Rejection of claims 1 and 13-21 in view of Ohno et al.

In the Office Action at pages 5-6, the Examiner rejects claims 1 and 13-21 under 35 U.S.C. §102(b) in view of Ohno et al. (U.S. Patent No. 5,348,783). This rejection is respectfully traversed and reconsideration is requested.

On page 5 of the Office Action, the Examiner asserts that the alternating layers of

GeTeSb recording layers of Example 1 disclose the phase control layer as recited in claim 1. Further, the Examiner asserts that the GeTeSb recording layer closest to the substrate acts as a phase control layer since the light used to record the other layers must pass through it.

By way of review, Ohno et al. discloses an optical information recording medium having a recording layer 2 that comprises alternating optically-active layers 5 and amorphous acceleration layers 6 as shown in FIG. 2. The optically-active layers 5 are of phase-changing materials and are thin so as to allow rapid heating and cooling. (Col. 6, lines 26-35). The amorphous acceleration layers 6 are of dielectric materials chosen to rapidly dissipate heat from the optically-active layers 5. (Col. 5, lines 60-68). The purpose of this construction is to increase the rate at which information is recorded and erased on and from the recording layer 2. Specifically, the combination of the thin optically-active layers 5 and the amorphous acceleration layers 6 produces a large cooling rate that cannot otherwise be achieved. (Col. 6, lines 40-45). While Ohno et al. discloses that the optically-active layers 5 change states when irradiated for the purposes of high-speed recording and erasing of data, there is no disclosure that the optically-active layers 5 change state in only certain areas within a light spot, or that ones of the optically-active layers 5 do not change states

Further, there is no disclosure that, even assuming arguendo that the GeTeSb recording layer closest to the substrate acts as a phase control layer when recording data as asserted by the Examiner, the GeTeSb recording layer closest to the substrate acts as a phase control layer when irradiated by a *reproducing beam* as does the phase control layer recited in claim 1. There is also no disclosure that the GeTeSb recording layer closest to the substrate changes phases when irradiated by a light while the other GeTeSb recording layers do not. There is additionally no disclosure that the GeTeSb recording layer closest to the substrate changes phases so as to produce a smaller light spot on the other GeTeSb recording layers.

In contrast, claim 1 recites a phase control layer having areas defined in a laser spot. When irradiated by a reproducing beam, one of the areas changes phase so as to alter an

optical path of the reproducing beam reflected from the phase change recording layer. As such, it is respectfully submitted that Ohno et al. does not disclose that "the irradiation with the reproducing beam of said phase control layer within the laser spot causes a phase difference due to one of the two areas changing between a crystal and an amorphous phase that alters an optical path of the reproducing beam reflected from said phase change recording layer so as to prevent portions of the reproducing beam reflected from said phase change recording layer from passing through the one area that has converted between the crystalline and the amorphous state, and said phase change recording layer does not change phases when irradiated by the reproducing beam" as recited in claim 1.

Similarly, it is respectfully submitted that Ohno et al. does not disclose "the irradiation of the laser spot on said phase control layer with the reproducing beam causes a phase difference in the plurality of areas on said phase control layer due to ones of the plurality of areas being converted between a crystalline and an amorphous state that alters an optical path of the reproducing beam reflected from said phase change recording layer so as to prevent portions of the reproducing beam reflected from said phase change recording layer from passing through the ones of the areas that have converted between the crystalline and the amorphous state, and said phase change recording layer does not change phases when irradiated by the reproducing beam" as recited in claim 18; and "the irradiation of the second laser spot on said phase control layer causes one area of said phase control layer within the second laser spot to be converted between a crystalline and an amorphous state so as to alter an optical path of a portion of the reproducing beam such that the second laser spot is larger than the first laser spot" as recited in claim 21.

Claims 13-17, 19, and 20 are deemed patentable due at least to their depending from corresponding claims 1 and 18.

4. Rejection of claims 1, 2, 9-11, and 13-21 in view of Kasami et al.

In the Office Action at page 4, the Examiner rejects claims 1, 2, 9-11, and 13-21 under 35 U.S.C. §102(b) in view of Kasami et al. (U.S. Patent No. 5,768,221). This rejection is respectfully traversed and reconsideration is requested.

The Examiner asserts that the use of dual recording layers 21 and 22 in FIG. 3 of Kasami et al. discloses a phase control layer and a phase change recording layer as recited in claim 1. By way of review, Kasami et al. discloses an optical disk having multiple recording layers 21 and 22. In order to access each layer, different objective lenses 5a and 5b form light spots 6A, 6B on the corresponding recording layers 21 and 22. (Col. 5, lines 1-4; FIG. 3). The light spots 6A, 6B change the states of the phase change materials 27, 30 of the corresponding recording layers 21 and 22 so as to record data. (Col. 5, lines 20-24; FIG. 1). However, there is no disclosure that, when either of the recording layers 21 or 22 is irradiated with the light spot 6A or 6B, only portions of the phase change material 27 or 30 within the light spot 6A or 6B undergo a state change while other portions do not.

On page 6 of the Office Action, the Examiner asserts that col. 1, lines 17-54, col. 2, lines 61-64, and col. 4, lines 30-40 all support the Examiner's position that prior art recording media undergo transitions between amorphous and crystalline states. However, even assuming arguendo that the Examiner is correct, it is noted that the transitions are disclosed as occurring during recording data or initializing the recording medium. (Col. 2, lines 60-64, col. 4, lines 30-40). There is no disclosure that the phase changes occur during reproducing of data, or that portions of the phase change material 27 within the light spot 6A or 6B undergo a state change so as to affect the optical path of the light used to read data from the phase change material 30 of the recording layer 22.

In contrast, claim 1 recites a phase control layer having areas defined in a laser spot. When irradiated by a reproducing beam, one of the areas changes phase so as to alter an optical path of the reproducing beam reflected from the phase change recording layer. As such,

it is respectfully submitted that Kasami et al. does not disclose "a phase control layer... having two areas defined in a laser spot," "wherein the irradiation with the reproducing beam of said phase control layer within the laser spot causes a phase difference due to one of the two areas changing between a crystal and an amorphous phase that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 1.

Similarly, it is respectfully submitted that Kasami et al. does not disclose "a phase control layer ... having a plurality of areas defined in a laser spot," "wherein the irradiation of the laser spot on said phase control layer with the reproducing beam causes a phase difference in the plurality of areas on said phase control layer due to ones of the plurality of areas being converted between a crystalline and an amorphous state that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 18; and that "the irradiation of the second laser spot on said phase control layer causes one area of said phase control layer within the second laser spot to be converted between a crystalline and an amorphous state so as to alter an optical path of a portion of the reproducing beam such that the second laser spot is larger than the first laser spot" as recited in claim 21.

Claims 2, 9-11, 13-17, 19, and 20 are deemed patentable due at least to their depending from corresponding claims 1 and 18.

5. Rejection of claims 1, 2, 9-11, and 13-21 in view of Rosen et al.

In the Office Action at pages 6-7, the Examiner rejects claims 1, 2, 9-11, and 13-21 under 35 U.S.C. §102(b) in view of Rosen et al. (U.S. Patent No. 5,761,188). This rejection is respectfully traversed and reconsideration is requested.

The Examiner asserts that the use of dual recording layers 90 and 92 in FIG. 3 of Rosen et al. discloses a phase control layer and a phase change recording layer as recited in claim 1. By way of review, Rosen et al. discloses an optical disk having multiple recording layers 90 and 92. In order to access each layer, actuator motors 216 adjust an objective lens 210 so as to

form light spots on one of the recording layers 90 and 92. (Col. 5, lines 25-30; FIG. 3).

On page 6 of the Office Action, the Examiner asserts that col. 1, lines 31-49 support the Examiner's position that prior art recording media undergo transitions between amorphous and crystalline states. However, even assuming arguendo that the Examiner is correct, it is noted that there is no disclosure that, when either of the recording layers 90 and 92 is irradiated with the light spot during reproduction, only portions of the recording layer 90 or 92 within the light spot undergo a state change. Further, there is no disclosure that the recording layers 90 and 92 change phases during reading of data from the recording layers 90 and 92 as the reading light is disclosed as being of a lower power. (Col. 4, lines 32-37). There is no disclosure that, when the recording layer 92 is irradiated, the recording layer 90 undergoes a phase change while the recording layer 92 does not undergo a phase change or that the recording layer 90 changes phase to alter the optical path of light focused on the recording layer 92.

In contrast, claim 1 recites a phase control layer having areas defined in a laser spot. When irradiated by a reproducing beam, one of the areas changes phase so as to alter an optical path of the reproducing beam reflected from the phase change recording layer. As such, it is respectfully submitted that Rosen et al. does not disclose "a phase control layer... having two areas defined in a laser spot," "wherein the irradiation with the reproducing beam of said phase control layer within the laser spot causes a phase difference due to one of the two areas changing between a crystal and an amorphous phase that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 1.

Similarly, it is respectfully submitted that Rosen et al. does not disclose "a phase control layer ... having a plurality of areas defined in a laser spot," "wherein the irradiation of the laser spot on said phase control layer with the reproducing beam causes a phase difference in the plurality of areas on said phase control layer due to ones of the plurality of areas being converted between a crystalline and an amorphous state that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 18; and

that "the irradiation of the second laser spot on said phase control layer causes one area of said phase control layer within the second laser spot to be converted between a crystalline and an amorphous state so as to alter an optical path of a portion of the reproducing beam such that the second laser spot is larger than the first laser spot" as recited in claim 21.

Claims 2, 9-11, 13-17, 19, and 20 are deemed patentable due at least to their depending from corresponding claims 1 and 18.

6. Rejection of claims 1, 2, 9-11, and 13-21 in view of Miyauchi et al.

In the Office Action at page 7, the Examiner rejects claims 1, 2, 9-11, and 13-21 under 35 U.S.C. §102(b) in view of Miyauchi et al. (Japanese Patent Publication No. 09-007224). This rejection is respectfully traversed and reconsideration is requested.

The Examiner asserts that the use of recording films 4, 6, 8 in FIG. 1 of Miyauchi et al. discloses a phase control layer and a phase change recording layer as recited in claim 1. By way of review, Miyauchi et al. discloses an optical disk having multiple recording films 4, 6, 8. During recording, each of the recording films 4, 6, 8 is melted. (Abstract of Miyauchi et al.) There is no disclosure that, when one of the recording films 4, 6, 8 is irradiated in a light spot, only portions of the recording films 4, 6, 8 undergo a state change. Further, there is no disclosure that the recording films 4, 6, 8 undergo a phase change using a reproducing beam instead of a recording beam. There is also no disclosure that, when the recording film 4 undergoes a phase change, the recording films 6 and 8 do not undergo a phase change. There is further no disclosure that the recording film 4 undergoes a phase change so as to alter the optical properties of the light beam focused on the recording films 6 and 8.

In contrast, claim 1 recites a phase control layer having areas defined in a laser spot. When irradiated by a reproducing beam, one of the areas changes phase so as to alter an optical path of the reproducing beam reflected from the phase change recording layer. As such, it is respectfully submitted that Miyauchi et al. does not disclose "a phase control layer... having

two areas defined in a laser spot," "wherein the irradiation with the reproducing beam of said phase control layer within the laser spot causes a phase difference due to one of the two areas changing between a crystal and an amorphous phase that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 1.

Similarly, it is respectfully submitted that Miyauchi et al. does not disclose "a phase control layer ... having a plurality of areas defined in a laser spot," "wherein the irradiation of the laser spot on said phase control layer with the reproducing beam causes a phase difference in the plurality of areas on said phase control layer due to ones of the plurality of areas being converted between a crystalline and an amorphous state that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 18; and that "the irradiation of the second laser spot on said phase control layer causes one area of said phase control layer within the second laser spot to be converted between a crystalline and an amorphous state so as to alter an optical path of a portion of the reproducing beam such that the second laser spot is larger than the first laser spot" as recited in claim 21.

Claims 2, 9-11, 13-17, 19, and 20 are deemed patentable due at least to their depending from corresponding claims 1 and 18.

7. Rejection of claims 1, 2, 9-11, and 13-21 in view of Akahira et al.

In the Office Action at page 7, the Examiner rejects claims 1, 2, 9-11, and 13-21 under 35 U.S.C. §102(b) in view of Akahira et al. (Japanese Patent Publication No. 03-157830). This rejection is respectfully traversed and reconsideration is requested.

The Examiner asserts that the use of recording thin film layers 3 and 5 of Akahira et al. discloses a phase control layer and a phase change recording layer as recited in claim 1. By way of review, Akahira et al. discloses an optical disk having recording thin film layers 3 and 5. (Abstract of Akahira et al.) There is no disclosure that, when one of the recording thin film layers 3 and 5 is irradiated in a light spot, only portions of the recording thin film layers 3 and 5 undergo

a state change. Further, there is no disclosure that the recording thin film layers 3 and 5 undergo a phase change using a reproducing beam instead of a recording beam. There is also no disclosure that, when recording thin film layer 3 undergoes a phase change, the recording thin film layer 5 does not undergo a phase change. There is further no disclosure that the recording thin film layer 3 undergoes a phase change so as to alter the optical properties of the light beam focused on the recording thin film layer 5.

In contrast, claim 1 recites a phase control layer having areas defined in a laser spot. When irradiated by a reproducing beam, one of the areas changes phase so as to alter an optical path of the reproducing beam reflected from the phase change recording layer. As such, it is respectfully submitted that Akahira et al. does not disclose "a phase control layer... having two areas defined in a laser spot," "wherein the irradiation with the reproducing beam of said phase control layer within the laser spot causes a phase difference due to one of the two areas changing between a crystal and an amorphous phase that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 1.

Similarly, it is respectfully submitted that Akahira et al. does not disclose "a phase control layer ... having a plurality of areas defined in a laser spot," "wherein the irradiation of the laser spot on said phase control layer with the reproducing beam causes a phase difference in the plurality of areas on said phase control layer due to ones of the plurality of areas being converted between a crystalline and an amorphous state that alters an optical path of the reproducing beam reflected from said phase change recording layer" as recited in claim 18; and that "the irradiation of the second laser spot on said phase control layer causes one area of said phase control layer within the second laser spot to be converted between a crystalline and an amorphous state so as to alter an optical path of a portion of the reproducing beam such that the second laser spot is larger than the first laser spot" as recited in claim 21.

Claims 2, 9-11, 13-17, 19 and 20 are deemed patentable due at least to their depending from corresponding claims 1 and 18.

D. REJECTION UNDER 35 U.S.C. §103:

1. Rejection of claims 1, 2, 9-11, and 13-21 in view of Coombs et al. and the Examiner's taking Official Notice

In the Office Action at page 3, the Examiner rejects claims 1, 2, 9-11, and 13-21 under 35 U.S.C. §103 in view of Coombs et al. and the Examiner's taking Official Notice that the recited dielectric materials can be used. This rejection is respectfully traversed and reconsideration is requested.

Even assuming arguendo that the Examiner is correct in taking Official Notice with regard to the recited dielectric materials, it is respectfully submitted that the Examiner's taking Official Notice does not cure the above noted deficiencies of Coombs et al. as applied to claims 1, 2, 9, 14, and 17-20 as discussed in Section C(1) above. As such, it is respectfully submitted that the combination of Coombs et al. and the Examiner's taking Official Notice does not disclose or suggest the invention recited in claims 1, 2, 9-11, and 13-21.

2. Rejection of claims 1-3, 5, 6, 8-11, and 13-21 in view of Tsukagoshi et al. and the prior art discussed in Section C

In the Office Action at pages 7-8, the Examiner rejects claims 1-3, 5, 6, 8-11, and 13-21 under 35 U.S.C. §103 in view of Tsukagoshi et al. (U.S. Patent No. 5,981,014) and each of the references discussed in Section C above. This rejection is respectfully traversed and reconsideration is requested.

The Examiner asserts that Tsukagoshi et al. discloses a dielectric layer disposed between a reflective layer and a UV cured layer. Even assuming arguendo that the Examiner is correct, it is respectfully submitted that Tsukagoshi et al. does not cure the above noted deficiencies of the references as applied to the claims as discussed above in Section C. As such, it is respectfully submitted that the combinations of Tsukagoshi et al. and the prior art discussed in Section C above does not disclose or suggest the invention recited in claims 1-3, 5,

6, 8-11, and 13-21.

ATTACHMENT:

Attached hereto is a "Version With Markings to Show Changes Made," comprising a marked-up version of changes made to the Claims by the current amendment.

CONCLUSION:

In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. And further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited and possibly concluded by the Examiner contacting the undersigned attorney for a telephone interview to discuss any such remaining issues.

If there are any additional fees associated with the filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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VERSION WITH MARKING TO SHOW CHANGES MADE

IN THE CLAIMS:

Please **AMEND** claims 1, 5, 8, 11, 13, 15, 18, and 21, as follows. The remaining claims are reprinted, as a convenience to the Examiner, as they presently stand before the U.S. Patent and Trademark Office.

1. (THREE TIMES AMENDED) A phase change optical disc compatible with a recording beam and a reproducing beam, comprising:

a transparent substrate;

at least one first dielectric layer thinly formed on said transparent substrate;

a phase change recording layer which converts between the crystal phase and the amorphous phase by irradiation with the recording beam;

a reflective layer; and

a phase control layer disposed between said transparent substrate and said phase change recording layer, said phase control layer having two areas defined in a laser spot, the laser spot defined by where the reproducing beam is incident to said phase control layer,

wherein:

the irradiation with the reproducing beam of said phase control layer within the laser spot causes a phase difference due to one of the two areas changing between a crystal and an amorphous phase that alters an optical path of the reproducing beam reflected from said phase change recording layer so as to prevent portions of the reproducing beam reflected from said phase change recording layer from passing through the one area that has converted between the crystalline and the amorphous state, [and]

said phase change recording layer does not change phases when irradiated by the reproducing beam, and

the phase control layer comprises a material selected from the group consisting essentially of GeSbTe, InSbTe, and Ni.

2. (NOT AMENDED)The phase change optical disc of claim 1, further comprising:

a second dielectric layer;

a third dielectric layer; and

a protective layer;

wherein said first dielectric layer, said phase control layer, said second dielectric layer, said phase change recording layer, said third dielectric layer, said reflective layer, and said protective layer are sequentially laminated on said transparent substrate.

3. (NOT AMENDED)The phase change optical disc of claim 2, further comprising a fourth dielectric layer disposed between said reflective layer and said protective layer.

4. (PREVIOUSLY CANCELED)

5. (THREE TIMES AMENDED)The phase change optical disc of claim [3] 1, wherein said phase control layer is [formed of a material selected from the group consisting essentially of the GeSbTe family with respect to changing between the crystalline and the amorphous states due to the reproducing beam,] InSbTe [family with respect to changing between the crystalline and the amorphous states due to the reproducing beam, AgInSb family with respect to changing between the crystalline and the amorphous states due to the reproducing beam, Au, and Ni].

6. (NOT AMENDED)The phase change optical disc of claim 3, wherein one of the two areas defined on said phase control layer has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that substantially has a

minimum value of 0 degrees, and the other area has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that substantially has a maximum value of 180 degrees.

7. (PREVIOUSLY CANCELED)

8. (THREE TIMES AMENDED)The phase change optical disc of claim [6] 1, wherein said phase control layer is [formed of a material selected from the group consisting essentially of the GeSbTe family with respect to changing between the crystalline and the amorphous states due to the reproducing beam, InSbTe family with respect to changing between the crystalline and the amorphous states due to the reproducing beam, AgInSb family with respect to changing between the crystalline and the amorphous states due to the reproducing beam, Au, and] Ni.

9. (NOT AMENDED)The phase change optical disc of claim 2, wherein one of the two areas defined on said phase control layer has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that substantially has a minimum value of 0 degrees, and the other area has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that substantially has a maximum value of 180 degrees.

10. (NOT AMENDED)The phase change optical disc of claim 2, wherein each of said first, second, and third dielectric layers is formed of a material selected from the group consisting essentially of Al_2O_3, ZnS-SiO_2, Si_3N_4, SiO_2, MgF_2, NaF_2, LiF_2, CaF_2, and AlF_2.

11. (TWICE AMENDED)The phase change optical disc of claim 2, wherein said phase change recording layer [is formed of] comprises a material selected from the group consisting

essentially of [the] GeSbTe [family with respect to changing between the crystalline and the amorphous states due to the recording beam], InSbTe [family with respect to changing between the crystalline and the amorphous states due to the recording beam], and [the] AgInSbTe [family with respect to changing between the crystalline and the amorphous states due to the recording beam].

12. (PREVIOUSLY CANCELED)

13. (THREE TIMES AMENDED)The phase change optical disc of claim [1] 11, wherein the phase control layer is [formed of a material selected from the group consisting essentially of the GeSbTe family with respect to changing between the crystalline and the amorphous states due to the reproducing beam,] InSbTe [family with respect to changing between the crystalline and the amorphous states due to the reproducing beam, AgInSb family with respect to changing between the crystalline and the amorphous states due to the reproducing beam, Au, and Ni].

14. (NOT AMENDED)The phase change optical disc of claim 1, wherein one of the two areas defined on said phase control layer has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that substantially has a minimum value of 0 degrees, and the other area has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that has a maximum value of 180 degrees.

15. (TWICE AMENDED)The phase change optical disc of claim 1, wherein said phase change recording layer [is formed of] comprises a material selected from the group consisting essentially of [the] GeSbTe [family with respect to changing between the crystalline and the amorphous states due to the recording beam], InSbTe [family with respect to changing between

the crystalline and the amorphous states due to the recording beam], and [the] AgInSbTe [family with respect to changing between the crystalline and the amorphous states due to the recording beam].

16. (NOT AMENDED)The phase change optical disc of claim 1, wherein each of said first, second, and third dielectric layers is formed of a material selected from the group consisting essentially of Al_2O_3, ZnS-SiO_2, Si_3N_4, SiO_2, MgF_2, NaF_2, LiF_2, CaF_2, and AlF_2.

17. (NOT AMENDED)The phase change optical disc of claim 1, wherein said reflective layer is formed of a material selected from the group consisting essentially of Al, Al-Ti, Cu, Au, and alloys of any of the above.

18. (THREE TIMES AMENDED) A phase change optical disc compatible with a recording beam and having multiple layers formed on a transparent substrate, the multiple layers including a reflective layer, comprising:

a phase change recording layer which converts between the crystal phase and the amorphous phase by irradiation with the recording beam; and

a phase control layer disposed between the transparent substrate and said phase change recording layer, said phase control layer having a plurality of areas defined in a laser spot, the laser spot defined by where the reproducing beam is incident to said phase control layer,

wherein:

the irradiation of the laser spot on said phase control layer with the reproducing beam causes a phase difference in the plurality of areas on said phase control layer due to ones of the plurality of areas being converted between a crystalline and an amorphous state that alters an optical path of the reproducing beam reflected from said phase change recording layer

so as to prevent portions of the reproducing beam reflected from said phase change recording layer from passing through the ones of the areas that have converted between the crystalline and the amorphous state, [and]

said phase change recording layer does not change phases when irradiated by the reproducing beam, and

the phase control layer comprises a material selected from the group consisting essentially of GeSbTe, InSbTe, and Ni..

19. (NOT AMENDED)The phase change optical disc of claim 18, wherein a material that forms said phase control layer defines the plurality of areas based upon a temperature profile of the material during irradiation by the reproduction beam.

20. (NOT AMENDED) The phase change optical disc of claim 18, wherein the plurality of areas comprise at least one area that has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that substantially has a value of 0 degrees, and at least one other area which has a phase difference, which alters an optical path of the reproducing beam reflected from said phase change recording layer, that substantially which substantially has a value of 180 degrees.

21. (ONCE AMENDED) An optical disc compatible with a reproducing beam and having multiple layers formed on a transparent substrate, comprising:

a recording layer having recording marks to be reproduced using the reproducing beam forming a first laser spot on said recording layer; and

a phase control layer disposed between the transparent substrate and said recording layer upon which the reproducing beam forms a second laser spot,

wherein:

the irradiation of the second laser spot on said phase control layer causes one area of said phase control layer within the second laser spot to be converted between a crystalline and an amorphous state so as to alter an optical path of a portion of the reproducing beam such that the second laser spot is larger than the first laser spot, and

the phase control layer comprises a material selected from the group consisting essentially of GeSbTe, InSbTe, and Ni..